Contents

Foreword ix

Preface xiii

Remarks on the occasion of the presentation of the Frank H. Spedding award to Karl A. Gschneidner, Jr., July 15, 1991 at Lexington, Kentucky xvii

Applied Science and Technology

An odyssey through the rare earths. A quest for knowledge 1
K. A. Gschneidner, Jr. (Ames, IA, USA)

Corrosion inhibition with rare earth metal salts. 15
B. R. W. Hinton (Melbourne, Australia)

Rare-earth doped fluoride glass fibres 27
J. Lucas and J.-L. Adam (Rennes, France)

Rechargeable hydrogen batteries using rare-earth-based hydrogen storage alloys 37
T. Sakai, H. Yoshinaga, H. Miyamura, N. Kuriyama and H. Ishikawa (Osaka, Japan)

Rare Earth Technology

Study of the electrodeposition and surface metallization of yttrium 55
S. Duan, C. Zhou, L. Chao, Z. Qiao and S. Wei (Beijing, China)

Concentrations of rare earth elements in human brain tissue and kidney stones determined by neutron activation analysis 63
C. Koeberl and P. M. Bayer (Vienna, Austria)

Recovery of rare earth elements from phosphorites in the USSR. 71
J. I. Skorovarov, V. D. Kosynkin, S. D. Moiseev and N. N. Rura (Moscow, Russia)

A study of the compositional homogeneity of an Nd–Fe master alloy ingot. 77
Z. Li, Z. Li and G. Yang (Beijing, China)

Spectroscopy

Stereochemical dynamics and recognition probed by lanthanide chiroptical spectroscopy 83
D. P. Glover, D. H. Metcalf and F. S. Richardson (Charlottesville, VA, USA)

Recent extensions to crystal-field and transition-intensity models. 93
M. F. Reid (Hong Kong)

Quark-like structures in the atomic f shell 105
B. R. Judd (Baltimore, MD, USA)

Spectroscopy, Crystallography, Surfaces and Catalysis

Optical properties and crystal field calculations of europium tellurium oxide. . . . 111
C. Cascales, E. Antic-Fidancev, M. Lemaitre-Blaise and P. Porcher (Meudon-Bellevue, France)

Structural studies in lead fluorogermanate and fluorosilicate glasses 117
S. J. L. Ribeiro, O. L. Malta, G. F. de Sá (Recife, Brazil), J. Dexpert-Ghys, B. Piriou (Meudon, France), H. Dexpert and V. R. Mastelaro (Orsay, France)

The sensitized fluorescence of polyethylene phthalate doped with 2-pyrazine carboxylic acid and its complexes with europium and terbium ions 125
W. M. de Azevedo, P. N. M. dos Anjos, D. L. Malta and G. F. de Sá (Recife, Brazil)

Comparative analyses of Nd^{3+} ($4f^3$) energy level structures in various crystalline hosts 131
J. R. Quagliano, F. S. Richardson (Charlottesville, VA, USA) and M. F. Reid (Hong Kong)

A high-resolution spectral study of Li_3Eu(2,6-pyridinedicarboxylato)$_3$ 141
N. A. Stump, L. L. Pesterfield, G. K. Schweitzer (Knoxville, TN, USA) and J. R. Peterson (Oak Ridge, TN, USA)

Spectroscopy of photoexcited rare earth ions 151
N. Pelletier-Allard and R. Pelletier (Orsay, France)

Laser-induced fluorescence studies of terbium triscyclopentadienide 157
G. K. Liu, J. V. Beitz (Argonne, IL, USA) and B. Kanellakopulos (Karlsruhe, FRG)

Unexpected relations between matrix elements of the three-body scalar operators t_i in the f shell 165
M. Bentley, B. R. Judd and G. M. S. Lister (Baltimore, MD, USA)

Chiroptical activity of holmium pyrogermanate: tetragonal $Ho_2Ge_2O_7$ 171
D. M. Moran, F. S. Richardson (Charlottesville, VA, USA), M. Koralewski (Poznan, Poland) and B. M. Wanklyn (Oxford, UK)

Optical absorption and emission spectra of Tb^{3+} in hexagonal crystals of Na_3[Tb(pyridine-2,6-dicarboxylate)$_3$]$\cdot NaClO_4 \cdot 10H_2O$ 177
J. P. Bolender, D. H. Metcalf and F. S. Richardson (Charlottesville, VA, USA)

Use of fluorescent probes for the investigation of solutions: the case of europium–carboxymethoxysuccinate complexes 183
J. Dexpert-Ghys (Meudon, France), J. van Westrenen, J. A. Peters and H. van Bekkum (Delft, Netherlands)

Luminescence properties of Eu^{3+} ($4f^6$) and Am^{3+} ($5f^6$) in thorium oxide 193
S. Hubert and P. Thouvenot (Orsay, France)

Perturbations of the luminescence spectra of europium–EDTA salts caused by selected monovalent counterions 201
L. L. Pesterfield, N. A. Stump, G. K. Schweitzer (Knoxville, TN, USA) and J. R. Peterson (Oak Ridge, TN, USA)

Effect of dopant concentration on optically stimulated luminescence properties of MgS 209
O. Missous, F. Loup, H. Prevost, J. Fesquet and J. Gasiot (Montpellier, France)

Analysis of the fluorescence of the ion Eu^{3+} in fluoroborate glasses containing silver particles 215
M. Couto, O. L. Malta and G. F. de Sá (Recife, Brazil)

Luminescence and crystal field calculation of aragonite-type $LaBO_3$:Eu^{3+} 223
E. Antic-Fidancev, M. Lemaitre-Blaise, P. Porcher (Meudon, France) and J. Chaminade (Talence, France)

Absorption spectra of solid rare earth complexes obtained from the inner filter effect on luminescence 229
L. C. Thompson, J. R. Marvin and N. C. Bettenberg (Duluth, MN, USA)

Fluorescence spectra of ARE_2I_5 and $AREI_3$ in the solid state (A≡K, Rb, Cs, Tl; RE≡Sm, Eu) 235
X. Zhao, S. Wang and B. Cao (Beijing, China)

First direct calculation of 4f→4f oscillator strengths for dipolar electric transitions in $PrCl_3$ 239
D. Garcia and M. Faucher (Meudon, France)

Effect of second neighbours on the crystal field in rare earth compounds 243
M. Faucher, D. Garcia and O. K. Moune (Meudon, France)

Neutron diffraction study of $RNiC_2$ (R=rare earth) compounds 251
W. Schäfer, G. Will (Bonn, FRG), J. K. Yakinthos and P. A. Kotsanidis (Xanthi, Greece)

Surface electronic structure of rare earth metals 259
R. I. R. Blyth, S. S. Dhesi, P. A. Gravil, K. Newstead, R. Cosso, R. J. Cole, A. J. Patchett, T. Mitrelias, N. P. Prince and S. D. Barrett (Liverpool, UK)

High temperature phase relationships in the Yb–H system 265
W. Iwasieczko, H. Drulis (Wrocław, Poland) and R. M. Frąk (Lublin, Poland)

Preparation and characterization of a praseodymium oxide to be used as a catalytic support 271
S. Bernal, F. J. Botana, G. Cifredo, J. J. Calvino, A. Jobacho and J. M. Rodríquez-Izquierdo (Cádiz, Spain)

The Series $LnSrVO_4$: synthesis, crystal structure, crystal chemistry and magnetic susceptibilities 281
J. E. Greedan and W. Gong (Hamilton, Ont., Canada)

Determination of catalytic active sites in (Ce^{3+}, Ca^{2+})–supported Y zeolite by Fourier transform IR spectroscopy 289
L. B. Zinner (São Paulo, Brazil) and A. S. Araujo (Natal, Brazil)

Catalytic behaviour and surface properties of supported lanthana 295
J. Castiglioni, R. Kieffer (Strasbourg, France), F. J. Botana, J. J. Calvino, J. M. Ridríguez-Izquierdo and H. Vidal (Puerto Real, Spain)

Coordination Chemistry I

New developments in actinide alkoxide chemistry 303
D. L. Clark, A. P. Sattelberger, W. G. Van Der Sluys and J. G. Watkin (Los Alamos, NM, USA)

Coordination Chemistry II

Gadolinium chelates as relaxation agents in magnetic resonance imaging 317
M. F. Tweedle (New Brunswick, NJ, USA)

Hydration of lanthanides and actinides in solution 325
E. N. Rizkalla and G. R. Choppin (Tallahassee, FL, USA)

Coordination and Bioinorganic Chemistry

The electronic structure of organometallic complexes of the f elements XXVIII: Interpretation of the optical and magnetochemical data of a cyclohexylisocyanide adduct derived from Tris(η^5-cyclopentadienyl)samarium(III) 337
H. Reddmann, H. Schultze, H.-D. Amberger (Hamburg, FRG), G. V. Shalimoff and N. M. Edelstein (Berkelely, CA, USA)

Synthesis and characterization of lanthanide trifluoroacetate complexes with 3-picoline-*N*-oxide 343
L. B. Zinner, C. A. Alves de Carvalho and K. Zinner (São Paulo, Brazil)

^{113}Cd nuclear magnetic resonance study of the binding of Cd^{2+} and Lu^{3+} to silver hake parvalbumin 349
C. Zhang and D. J. Nelson (Worcester, MA, USA)

Lanthanide inhibition of 5′-nucleotidase in the phosphodiesterase assay of calmodulin 357
J. M. Buccigross, K. E. McDonald and A. J. Schroeder (St. Joseph, OH, USA)

Luminescence of lanthanide cryptates: effects of phosphate and iodide anions 363
N. Sabbatini, M. Guardigli (Bologna, Italy), J.-M. Lehn (Strasbourg, France) and G. Mathis (Bagnols s Cèze, France)

Europium(III) complexation with glycine 369
H. B. Silber, T. Parker and N. Nguyen (San Jose, CA, USA)

The effect of ligand rigidity on the stability of europium(III) complexes with substituted diglycolic acids 375
K. L. Nash, E. P. Horwitz, R. C. Gatrone and P. G. Rickert (Argonne, IL, USA)

Mean molal activity coefficients of aqueous scandium chloride, nitrate, bromide and perchlorate solutions at 25.0 °C 383
Y. Suzuki, R. Yoshino, H. Saitoh, K. Fukushi and Y. Sonehara (Kawasaki, Japan)

Rare earth(III) complexes with indole-derived acetylacetones
I: synthesis and characterization of rare earth(III) complexes 391
S. L. Wu, Y. L. Wu and Y. S. Yang (Guangzhou, China)

Rare earth(III) complexes with indole-derived acetylacetones
II. Luminescent intensity for europium(III) and terbium(III) complexes 399
S. L. Wu, Y. L. Wu and Y. S. Yang (Guangzhou, China)

Rare earth(III) complexes with indole-derived acetylacetones
III: Quenching of terbium(III) luminescence in Tb–L (or A)–phenol by phenol 403
S. L. Wu and Y. S. Yang (Guangzhou, China)

Study of extraction of the $NdCl_3$–$SmCl_3$–HCl–H_2O–di-(2-ethylhexyl)-phosphoric-acid–kerosine system 409
W.-H. Ya, Y.-Y. Shen and Q.-F. Xue (Beijing, China)

Author Index 415

Subject Index 417